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ABSTRACT

A study was conducted to develop and field test a model which could be used to evaluate the effectiveness of vocational education received by handicapped students. The study included four components: (1) conceptualizing a cost effectiveness analysis appropriate for vocational education for the handicapped (VEH), (2) developing a cost effectiveness analysis model and instruments needed to conduct the analysis, (3) field testing the model in a variety of high school districts to establish the validity and replicability of the model, and (4) producing and disseminating a handbook of the model to be used by administrators to evaluate the cost effectiveness of a district's VEH programs. Findings included the following: most special education courses have vocational content; this content is usually on independent living skills, pre-vocational skills, and vocational skills; and vocational teachers spend extra time with handicapped students. Samples of project materials are appended. (CT)

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A COST EFFECTIVENESS ANALYSIS OF VOCATIONAL EDUCATION PROGRAMS FOR THE HANDICAPPED TECHNICAL REPORT

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PREFACE

TO: ADMINISTRATORS OF VOCATIONAL PROGRAMS

This handbook was developed to assist your district by providing an evaluation model to more effectively measure the cost and effectiveness of your vocational programs for handicapped students.

With the passage of Proposition 13, declining enrollments, increased costs of services and yet, a continuous need for programs regardless of cost; the necessity to make cost effective decisions has become critical.

The model presented here relies on existing data that your district provides in various state and federal reports and responses to questionnaires included in this handbook. Once the steps outlined in the handbook have been completed, the resulting information will assist you in more effective program planning and implementation on a more cost effective basis.

Your suggestions, concerns and comments on this handbook would be sincerely appreciated.

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CHAPTER I

INTRODUCTION

In section 613 (a) (11) of Public Law 94-142 it is mandated that, "State plans must provide for procedures for evaluation at least annually of the effectiveness of programs in meeting the educational needs of handicapped children." However, at a time when the mandate is clear but resources are limited, administrators need more than just information on the effectiveness of programs for the handicapped. Cost information is essential if an administrator is to choose between alternative programs and maximize the resources of a district.

The purpose of this study was to develop and field test a model which could be used to evaluate the effectiveness of vocational education received by handicapped students. The study has built directly upon the findings of earlier research (Ellis Corporation, 1977) which established criteria for measuring the success of vocational education for the handicapped programs (VEH programs). The present study has developed cost analysis procedures for VEH programs and incorporated them, along with the success criteria, into a comprehensive evaluation model.

The study included four components: 1) conceptualizing a cost effectiveness analysis appropriate for

vocational education programs for handicapped students, 2) developing a cost effectiveness analysis model and instruments needed to conduct the analysis, 3) field testing the model in a variety of high school districts to establish the validity and replicability of the model, and 4) producing and disseminating a handbook of the model to be used by administrators to evaluate the cost effectiveness of a district's VEH programs. The study was funded through the Vocational Education Act (VEH) Part C, Project Number 30-66514-3-8-146 and administered through the Fullerton Union High School District. The project began in May of 1978 and was completed in June of 1979.

For the purposes of this study, "handicap" refers to those students with a handicapping condition which will limit their chances of obtaining and keeping a job. Minor speech impairments, allergies, pregnancy, etc. are not considered handicapping conditions in this research.

1. Physically (PH): Includes blind, partially seeing, and orthopedically handicapped.
2. Communicatively (CH): Includes deaf, deaf/blind, and severe language handicaps.
3. Learning (LH): Includes learning disabilities, behavior disorders, and educable mentally retarded (EMR).
4. Severely (SH): Includes trainable mentally retarded (TMR) and autistic.

For this study, "vocational education" has been defined to include one or more of the following:

1. Independent Living Skills: Skills which help students to interact with the community: e.g. using public transportation and counting money, as opposed to feeding and dressing oneself.

2. Pre-vocational Skills: Skills which help students understand activities and responsibilities in working situations; e.g. job seeking skills, filling out job applications.

3. Vocational Skills: Skills in a particular job; e.g. small engine repair or horticulture.

The report that follows is a technical report for those individuals who are interested in the research that led to the development of the evaluation model. The report begins with a review of literature, followed by chapters on the development of the evaluation model, the methodology for field testing the model, and the results of the field test.

The Handbook for the Evaluation of Vocational Education Programs for the Handicapped is printed separately and represents the distillation of two research projects. The Handbook is designed for use by vocational education and special education administrators throughout the state.

CHAPTER II

REVIEW OF LITERATURE

A review of the literature was conducted to determine what existing cost analysis techniques would be applicable to the present study. A great deal has been written on the technique of cost analysis as it relates to many different fields from education to national defense. There are several approaches to examining costs, the most common of which are a cost efficiency analysis, a cost analysis, and a cost effectiveness analysis. Cost efficiency refers only to the costs associated with completing a given task or operating a given program. Cost alone is considered apart from the quality or impact of a program or project. Cost efficiency studies have computed costs on a program, course or per pupil basis, or according to a unit of time, such as a student contact hour. These studies often compare the costs of vocational or special education to those of general or regular education.

Although definitions of cost benefit and cost effectiveness are sometimes confused, there is a general consensus that cost benefit demands that both costs and outcomes be specified in monetary terms, while cost effectiveness reviews costs in relationship to program outcomes that are expressed in non-monetary terms. As stated by Forbes

(1974), "Effectiveness is a measure of the achievement of program objectives" while "cost benefit weighs the costs and resulting monetary benefits of one or more programs or program components." Similarly, Alkin (1970) states that "Cost benefit is primarily an economic analysis" and "if we choose to analyze a program in which all outcomes are not definable in economic terms, we must turn to cost-effectiveness analysis." Finally, Kim (1976) makes the following distinction between the two techniques: "Cost effictiveness analysis is distinguished from cost-benefit analysis by concentrating on the measure of program effectiveness as the degree of goal attainment, which cannot be priced. In cost-benefit analysis, benefits are expressed in the same monetary units as costs."

The approach most appropriate for this study, which analyzes costs in relation to success criteria for VEH programs established earlier by Ellis Corporation (1977), is a cost-effectiveness analysis. Therefore, the literature review has focused primarily on cost-effectiveness techniques as they relate to vocational education and special education, and secondarily, on cost efficiency techniques which would help define cost categories for data collection in each area.

Over the past decade, there have been several cost analysis studies of vocational education, and more recently,

of special education, but there have been no cost analysis studies on the vocational education of handicapped students. By examining each separately, the researchers have been able to isolate the important cost factors to be considered in vocational and special education.

A study by Doty and others (1976) was addressed to the question "What does it cost to educate one person in a selected [vocational] program?" The data collection model adopted for the study allowed per pupil costs to be calculated at six different levels: 1) district level, 2) building level, 3) vocational building level, 4) program level, 5) average cost per pupil per type of educational goal, 6) total cost. Data was collected by a team of investigators from four schools, including two comprehensive high schools, one shared time Area Vocational Technical School (ATVS) and one full-time AVTS. Independent variables for the study were average daily enrollment (ADE) and direct and indirect operating costs for LEAs in the sample. Costs per pupil were calculated for each of the above levels as follows:

$$\text{Cost Per Pupil} = \frac{\text{Total Expenditures at Each Level}}{\text{ADE at Each Level}}$$

The results of the study are shown on a series of tables detailing the cost figures for each type of school at each level.

The findings can help administrators determine the cost of operating programs once initial capital outlays have been made. However, these costs cannot be used to make comparisons among schools without a measure of the objectives and outcomes of the schools. In terms of Doty's categories, the present study emphasizes costs at the program level. However, in the case of VEH programs, "program" is often not well-defined, for it is a coordination of efforts by program administrators and educators in both vocational education and special education. In this context, therefore, programs will be defined as all expenses directly related to the vocational education of handicapped students.

A similar study in Tennessee (Harris and O'Fallon, 1973) calculated delivery costs per contact hour for secondary school vocational technical education. The purpose of the study was to establish a cost index per vocational course that would enable decision-makers to predict the cost of a vocational-technical program category or course. Differences in school district record keeping procedures were overcome by using a set of data collection instruments which were designed to transfer information from school records to forms which would make it available for computer analysis. The research team collected data from six schools to determine direct and indirect costs per student contact hour for each course.

The data showed that the same course can cost considerably more in one school than in another. The researchers found that costs related to program categories, courses, and course enrollments and not to school size, school location, or program breadth. The two major cost factors for every program category and course were teachers' salaries (from direct costs) and indirect costs, which together totalled more than 70% of all expenditures.

Although the information provided in this study enables administrators to estimate the cost of implementing a given course, it says nothing about the relationship of costs to program impact. Some of the more costly programs may be worth the added expense in terms of effectiveness, while others may simply be more costly due to poor planning or mismanagement.

In the area of special education, a study on "The Cost of Educating Handicapped Pupils in New York City" (1977) calculated the cost per pupil and the total dollar cost of each of 35 programs for handicapped children in New York City. The cost of special education was compared with the school system's regular education program. Three different methods of calculating program costs were used in the study, each representing a different way of defining what constitutes the total cost of a program: 1) the "all-inclusive method" which includes all funds received

and spent by the Board of Education over the nine-month school year; 2) the "basic education program method" which excludes reimbursable aid for supporting activities and services which are experimental or primarily non-educational in nature; and 3) the Rossmiller method, which takes into account only those cost components which are related to the "core educational program."

The findings, of course, vary considerably according to the method of calculation employed. The following mean costs were calculated using the "basic educational program method":

- $ 5,624 for the physically handicapped
- 7,784 for the hearing handicapped
- 4,243 for the EMR students.

Cost differentials among programs were found to be primarily a function of variations in expenditures for instructional services, supportive clinical services, and transportation. Cost rises as class size decreases, because the cost of instruction is approximately half of the total expenditures.

The study also found that mainstreaming may not be as inexpensive as it is often considered to be. Programs serving hearing handicapped pupils in resource rooms or through itinerant teachers cost $4,311 per student, compared to an average per pupil cost of $6,644 for special programs. However, for the visually handicapped, the resource/itinerant program is more expensive than the average

special program cost. The study stated that "More analysis needs to be done on the costs of mainstreaming." The present study contributes further information in this area, not only on costs but also on the effectiveness of mainstreaming students versus providing them with special vocational programs.

A report by Norton and Sommers (1975) summarizes the efforts of the Wausau District Public Schools to develop a model for cost-efficiency analysis in special education. The report discusses issues concerning cost-efficiency analysis and sets forth a model which is a modification of the work by Rossmiller, Marinelli and Greske (1975). The model includes the following elements: 1) resource inputs for the external-to-school environment, 2) components of the educational system, 3) outputs of the educational system, 4) feedback. The feasibility of the model has not been demonstrated, for it has neither been implemented nor piloted by the authors.

The report states that "It is not possible for a LEA to independently perform advanced cost-efficiency activities in special education" and that "additional assistance from outside agencies is needed to hasten the development of a cost-efficiency capability." The study does claim to have led to the development of new student accounting procedures for the district. From the way the report has been organized

and presented, it is clear that the authors do not intend other districts to implement their model without external assistance. In all three of the above studies, the researchers pointed out that district and school budgets are not constructed in a way that permits quick and accurate cost accounting. The present study faced the same challenge - that of gathering comparable data from widely different budget formats. An accurate cost analysis of any kind for educational programs is at this point extremely difficult to perform, not only in California but in other states as well.

A study by Essigs and Engle (1976) provides a useful format for examining special education program costs. As a preliminary to discussing special education funding and per pupil expenditures in Arizona, the study reviews other cost studies in special education. Those using a cost index approach, which is "a ratio of the cost of programs for exceptional children to the cost of programs for regular students" include: Rossmiller, Hale, and Frohreich (1970), McLure and Pence (1970), Sorenson (1973), Clemmons (1974), and McLure et.al. (1975).

As an alternative to the cost index approach, the report discusses the concept of the "student education unit" as developed by Ernst and Ernst (1974). This technique defines units of service as a ten minute period, and examines

costs in terms of delivery of units of service. A third alternative for analyzing costs of special education is set forth in a report by the Management Analysis Center (Bernstein, 1974). The argument here is for a judgmental rather than an empirical model for analyzing fiscal problems. This report stressed that "the purpose of expenditures should be clearly defined prior to the determination of financing procedures." Three components (type of handicap, severity of handicap, and delivery method) should be identified and compared when examining relative costs of alternative programs.

The final, and preferable, format proposed by Essigs and Engle is based on the work of Drs. T. Frank Saunders and Roy F. Blade, of the University of Arizona, and Dr. Colleen Decker of Pima Community College. Here, the three components of type of handicap, severity of handicap, and delivery method are presented in a three-dimensional configuration, which provides "more precise information about the cost of a school system's expenditures by itemizing the individual cost components." Since the purpose of the present research was not to develop cost figures for VEH programs, but to make comparisons between costs and impact of alternative programs, this format was chosen as the method for analyzing costs. As stated by the authors: "The use of this format enhances the possibility of making

meaningful inter-school-system comparisons, and also provides a basis for examining specific special education expenditures within a given system."

While there are a multitude of studies on the costs of vocational and special education, few analyze costs in relationship to effectiveness. In his "Review and Synthesis of Cost-Effectiveness Studies of Vocational and Technical Education," Stromsdorfer (1972) discusses the difficulties inherent in cost-benefit studies (a term he uses interchangeable with cost-effectiveness). The benefit-cost studies that Stromsdorfer summarizes in his paper report only monetary economic costs and benefits and do not account for non-monetary costs or benefits. For this reason, and the fact that Stromsdorfer is an expert in the field and many of his concerns, as well as his formulas for cost-benefit calculations are rxtremely technical, his review was not particularly useful for the purpose of the present study. However, some of the observations he makes are of interest.

One difficulty Stromsdorfer points out is that "the objectives of vocational education are still multi-dimensional and the specification of a single functional relationship which uniquely encompasses all of those simultaneous objectives is extremely difficult and remains, as yet, to be done." Another limitation is that "currently a benefit-cost

study will only show whether or not a program appears to pay. Further judgements must be made on whether to expand or cut back the program, and what to give up or take on."

Stromsdorfer goes on to outline the steps necessary for a model to evaluate any program within vocational education:

1. The program objectives or desired program outcomes must be specified.
2. The processes or activities used to implement the program must be specified.
3. A cost function or cost relationship based on the production functions given for each activity must be specified.
4. A benefit function(s) must be specified based on an appropriate index or set of indices designed to measure program outputs.
5. Costs and benefits must be compared.

A more practical study by Hayes and others (1976) examined the costs of special education in Pennsylvania in relation to its quality. A random sample of classes was selected for each of five categories of exceptionality: 1) EMR, 2) TMR, 3) brain injured (BI), 4) socially and emotionally disturbed (SED), and 5) physically handicapped (PH). Quality was measured by scores on achievement tests, a social maturity instrument, and a list of quality indicators, developed for the study on the basis of imput by parents, teachers, supervisors, and other professionals in the field. Costs were gathered for 1) general administration,

2) special education administration, 3) direct instructional costs, 4) instructional support, 5) instructional materials and equipment. A few of the findings are of interest to the present study:

1) Costs of special education did not consistently correlate with quality of instructional programs as measured with the quality indicators.

2) Costs of special education did not consistently correlate with achievement gains, but some relationship was discernible. For example, costs contributed significantly to achievement gains in reading and spelling for elementary EMRs, in reading for the secondary EMRs, in reading for elementary TMRs, and in spelling for the elementary socially and emotionally disturbed, physically handicapped and brain injured.

3) Self-contained classes were more expensive then other delivery systems.

In other words, the most expensive program is not necessarily the most effective program. The study made no attempt to determine the factors responsible for the variations in cost and quality from program to program.

A study by Kim (1976) developed a cost-effectiveness analysis model for secondary vocational programs that has provided important information and useful procedures for the present research. Kim's model included four major components; 1) program structure, 2) objectives, 3) costs, and 4) outputs. The model also produced three measures: 1) effectiveness, 2) efficiency, and 3) a cost-effectiveness and performance ratio.

The model and instruments for data collection were reviewed by vocational directors and business managers in three school corporations, and revisions were made as necessary. The performance objectives, which were used to measure program effectiveness, were developed by an advisory committee. Hypothetical data were used for testing cost effectiveness measures as presented in the model.

The model developed by Kim is important in several ways. It has clarified the question of cost effectiveness as it relates to vocational education programs. It can be implemented without outside technical assistance, which increases the chance that it will be used by district administrators. As indicated by the research reported above, there are many possible approaches to gathering cost data for vocational programs. Kim has identified categories that can provide relevant information and for which costs can be retrieved from district records. Finally, the study links costs to the degree of attainment of measurable performance objectives.

The definition of cost effectiveness, the four components, and the cost effectiveness and efficiency measures from Kim's model have been used in the present study. The obvious difference is that VEH programs have costs, objectives, and outputs that are different from

regular vocational education programs. The data-gathering process is more complex, since costs must be drawn from both vocational education and special education, and the formulas for calculating cost effectiveness are more difficult to apply.

The cost effectiveness model that has resulted from the present study has two major advantages over Kim's model: 1) the model has been developed on the basis of actual data collected from six school districts, while Kim used hypothetical data to test his model, and 2) the performance objectives for the model are not only a matter of professional judgement, which can vary widely from area to area, but are based on research which determined success criteria for VEH programs in California.

The present study has benefited from the research studies summarized above in the following ways: 1) the identification of cost categories which can yield useful cost data for vocational education and special education, 2) a model for conceptualizing a cost efficiency analysis of special education, 3) procedures for conducting a cost effectiveness analysis for vocational education. The information and cost-analysis techniques derived from the literature have been adapted as necessary to suit the focus of the present study.

The present study has gone beyond past research in the following ways: 1) it has developed a cost-effectiveness analysis procedure specifically for the vocational education of handicapped students; 2) it links costs to success criteria which have been derived from research; and 3) it has developed practical techniques for VEH evaluation, rather than theoretical or overly technical methodologies that cannot be implemented by district administrators.

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CHAPTER III

DESIGN FOR A COST EFFECTIVENESS MODEL

The two published cost analysis models most applicable to the present study are those by Kim (1976) and Essigs and Engle (1976). The theoretical adaptation of these models to the present project is discussed below. The procedures for field testing the model are outlined in the following chapter on methodology.

Kim's Model to Evaluation Vocational Education Progress

The four components of Kim's model include: 1) program description, 2) costs, 3) objectives, and 4) output. The three cost effectiveness measures generated from the components are: 1) program effectiveness, 2) cost efficiency, and 3) cost effectiveness. An understanding of these three measures is necessary for an understanding of the model developed specifically for VEH programs.

Program Effectiveness

To compute the program effectiveness score, Kim used the following formula:

$$\text{Effectiveness Score} = \frac{\text{Output}}{\text{Target Goals}}$$

Output is the extent to which target goals or objectives were reached. For example, a target goal may be that 80% of the mainstreamed handicapped students received

individualized instruction. If performance data shows that 75% of the identified students received individualized instruction, then the formula would read as follows:

$$\text{Effectiveness Score} = \frac{\text{Output}}{\text{Target Goals}} = \frac{.75}{.80} = .93$$

Kim also computed an effectiveness index, which is the composit of the total effectiveness scores times their assigned weight. If the weight assigned to the target goals of individualized instruction were 100, then the weighted effectiveness score would be:

$$\text{Effectiveness Score} = .93 \times 100 = 93$$

Using Kim's model, the weight assigned to each target goal should be determined by experts in the field according to the relative importance of the goal. Effectiveness indices for all objectives are combined to produce a composit effectiveness index for the program as a whole.

The following information is needed to compute the effectiveness index:

a. Stated behavioral objectives for the program

b. Student performance data

c. Weighted index for each objective.

Cost Efficiency

Kim computes cost efficiency according to unit cost.

The formula he presents is as follows:

$$\text{Unit Cost} = \frac{\text{Total Cost of the Program}}{\text{Unit of Output(s)}}$$

In this formula, the total cost of the program includes direct costs, salaries, benefits, supplies, equipment, building and contracts, and indirect costs. The unit of output is the number of students in each of the seven vocational education areas: 1) agriculture, 2) distributing, 3) health, 4) home economics, 5) trade and industry, 6) industrial arts, and 7) office. The unit cost is the cost per student in these programs.

Cost Effectiveness Ratio

The Cost Effectiveness Ratio indicates the degree to which program objectives have been met in relationship to the cost.

$$\text{C/E} = \frac{\text{Effectiveness Index}}{\text{Unit Cost}}$$

If the unit cost for vocational education at District A is $2,500 and the effectiveness index was calculated to be 93, the cost effectiveness ratio would be as follows:

$$\text{C/E} = \frac{\text{Effectiveness Index}}{\text{Unit Cost}} = \frac{93}{\$2,500} = .03$$

Essig's Model to Evaluate Special Education Programs

The original intent of this study was to apply the Essig model to the evaluation of VEH programs. In this model the three components of 1) type of handicap, 2) severity of handicap, and 3) delivery method are combined to generate individual cost components. These individual costs are compared to determine which delivery method is most effective, controlling for handicap. Essig's model is conceptualized below:

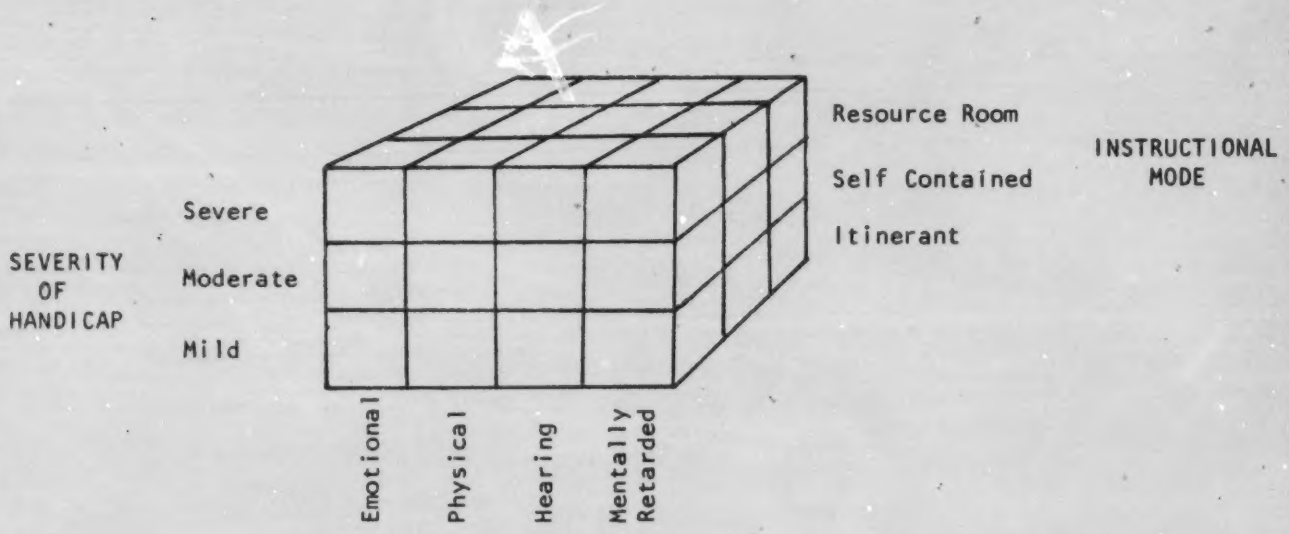

Figure 1. Essig's Model for Interrelationship of Cost Components.

The advantage of this model is that comparisons can be made of alternative instructional methods for students with the same handicap and degree of severity. For example, the model allows administrators to look at cost per pupil for providing mild learning handicapped students a program using a resource room with a program using an itinerant teacher. Once these model costs have been itemized, then it would also be possible to conduct inter-district comparisons for program types addressing the same educational needs and using the same instructional model.

Unfortunately, the researchers found that the six target districts could not provide the data that was needed for this model. Budget information for special education is recorded by special education program (e.g. EMR program, autistic program,orthopedically handicapped program, etc.) and not by course content or delivery method. Furthermore, severity of handicap is no longer an issue within courses, since all students are classified as severely handicapped (TMR, autistic, or severely emotionally disturbed or non-severely handicapped).

Since information was not obtainable for two of the three components of the model the model was not used in this study. The researchers do feel, however, that the model developed by Essig and Engle remains a useful means

of comparing the costs of VEH programs, if districts can provide the needed cost data.

A Model to Evaluate VEH Programs

The evaluation design proposed for this project is essentially a combination and adaptation of the Kim and Essig Models. The adaptation was guided by three principal criteria:

1. Is this aspect of the model appropriate to evaluating programs where special education and vocational education intersect?
2. Is the required data available and accessible?
3. How likely is it that administrators will be able to carry out the requirements of the model?

The model presented by Kim has been adapted to provide product evaluation information for VEH programs. The Essig model has been adapted to provide process evaluation for VEH programs.

Product Evaluation Design Model

The project evaluation utilizes the three formulas developed by Kim. The way in which each formula has been adapted for the present study is presented below.

1. Effectiveness Index. Kim's formula for determining program effectiveness is as follows:

$$\text{Effectiveness Index} = \frac{\text{Output}}{\text{Target Goal}} \times \text{Weight}$$

The study by Ellis Corporation (1977) found that the large majority of school districts do not establish target goals or objectives. The success criteria established by that research were used as the target goals in the effectiveness formula for the present study. The target goals are listed in Appendix A. The weight assigned each objective by the Advisory Committee for this study is also indicated. The output(s) were measured by the results of the follow-up study conducted as part of this project. The procedures for the follow-up study are described in Chapter IV on Methodology. The output(s), divided by the target goal(s) and multiplied by the weight, equal the effectiveness index. The effectiveness index for each target goal was added to get the composit effectiveness index for the VEH program.

2. Cost per Student. Kim's formula for determining the cost per student, or unit cost, is as follows:

$$\text{Unit Cost} = \frac{\text{Program Costs}}{\text{Units of Output}}$$

The program costs for VEH programs include the direct costs of special and vocational education instructional programs and the support services costs for counselors, psychologists and administrators. Ellis Corporation's adaptation of Kim's formula for establishing program costs for both vocational education and special education is presented below:

a. Special Education Costs for VEH Programs. To determine program costs, Kim totaled the direct and indirect costs for vocational education. For VEH programs, it was necessary to prorate the special education program costs for providing vocational preparation to handicapped students. The following procedures were follwed:

1. Identify which courses/programs in special education have a vocational content.
2. Determine what portion of the course/program was vocational.
3. Specify time spent outside of the course/program by teachers and aides planning and supplementing VEH; e.g. conferences with regular vocational education teachers.
4. Calculate transportation costs to training sites.

The unit of output in special education VEH programs were those students receiving the vocational preparation.

The VEH adaptation of Kim's formula for special education is as follows:

$$\text{Unit Cost for VEH Special Education Programs} = \frac{\left[\left[\begin{array}{l}\%\text{ Course Time} \\ \text{on VEH}\end{array} + \begin{array}{l}\%\text{ Outside} \\ \text{Time}\end{array}\right]\left[\begin{array}{l}\text{Special} \\ \text{Education} \\ \text{Program} \\ \text{Costs}\end{array}\right] + \begin{array}{l}\text{VEH Transportation Costs} \\ \hline \text{Number Students Served}\end{array}\right]}{\text{Number Students Served}}$$

b. Vocational Education Costs for VEH Programs. The cost of having special education students mainstreamed into regular vocational classes is in addition to the cost per regular student. Results of interviews with regular

teachers consistently reveal that handicapped students require more time and more materials than the regular students (Ellis, 1977 and the present research). The VEH costs for regular vocational classes must then include additional costs for handicapped students. Using Kim's formula:

$$\text{Unit Cost} = \frac{\text{Total Program Costs}}{\text{Total Number of Units}}$$

and adding additional costs for VEH, the revised formula is as follows:

$$\text{Unit Cost for VEH} = \text{Unit Cost for Vocational Education} + \frac{\text{Additional VEH Costs}}{\text{\# Handicapped Students Served}}$$

The additional costs for VEH include the following:

1. Teacher and aide time spent in class providing handicapped students with additional instruction beyond time required for regular students;
2. Time spent outside of class on VEH tasks; e.g. conferences with special education teachers;
3. Additional materials and supplies required specifically for handicapped students; e.g. more metal to practice welding, instruction books requiring minimal reading skills;
4. Additional equipment or equipment adaptation costs for making equipment available to handicapped students; e.g. lower work tables for students in wheel chairs.

The following formula was used for converting vocational education program costs to the VEH unit costs:

$$\text{Unit Cost for VEH} = \text{Unit Cost for Voc.Ed.} + \frac{[\%\text{ Teacher Time Spent Outside of Class}][\text{Annual Teacher Salary}]}{\#\text{ VEH Students Served}} + \frac{[\%\text{ Aide Time Spent in Outside Class}][\text{Annual Aide Salary}]}{\#\text{ VEH Students}} + \frac{[\text{Cost of Extra Supplies \& Materials}]}{\#\text{ VEH Students}}$$

c. Support Services Costs for VEH Programs.

The program costs for providing vocational education and career information to handicapped students are not limited to the special education and vocational education departments. Regular and special education counselors, psychologists, career center staff, and work experience coordinators also provide direct VEH services. Administrators organize, manage, and prepare budgets for VEH programs, thereby providing indirect services. To measure the contribution of these individuals to the VEH programs, the following formula was developed:

$$\text{VEH Support Services Costs} = \text{Cost Per Handicapped Student} \times \text{Percent Staff Time on VEH}$$

Because administrative costs for VEH programs are indirect to all students and are different in nature from other support services, these costs were calculated separately. The same formula was used to calculate administrative costs and then that total was added to the support staff unit cost.

The following information is needed to compute the staff and administrative support costs for VEH programs:

a. Total income of support staff providing VEH services.

b. Total number of handicapped served by staff.

c. Total number of students served by staff.

d. Percent of time spent on vocational education for the handicapped.

e. Total income of administrative staff involved with VEH.

f. Total number of handicapped served by administrators.

g. Total number of students served by administrators.

h. Percent of time spent by administrators on VEH.

To arrive at a total cost efficiency figure, the unit cost or cost per student, for 1) vocational preparation in special education, 2) regular vocational education, and 3) support services were added together. Adapting Kim's formula for cost efficiency to include these three unit costs produces the formula below:

Unit Cost For VEH Programs	=	Unit Cost For VEH Special Education	+	Unit Cost For VEH Vocational Education	+	Unit Cost for VEH Support Services

3. Cost Effectiveness Ratio. Kim's cost effectiveness ratio is as follows:

$$\text{C/E Ratio} = \frac{\text{Effectiveness Index}}{\text{Unit Cost}}$$

Dividing the effectiveness index by the unit costs indicates the degree to which program objectives have been met in relation to cost. Once the effectiveness index and unit costs were calculated specifically for VEH programs, it was not necessary to adapt this formula in any for the VEH cost analyses.

Process Evaluation

Because it was not possible to develop the three dimensional matrix recommended by Essig to compare modes of teaching students with varying degrees of exceptionality, the present study relied on the Kim model. In the product evaluation cost per student was derived for special education, vocational education and support services. In the process evaluation the cost per student was generated for the programs within special education and vocational education. The cost efficiency formula adapted from Kim's model was used to ascertain the cost per student in the 1) physically handicapped, 2) communicatively handicapped, 3) learning handicapped, 4) and severely handicapped programs in special education and the 1) agriculture, 2) home economics, 3) office, 4) trade and industry, and 5) work experience programs in vocational education.

CHAPTER IV

METHODOLOGY

Given the complexity of the problem, it was essential that the research group have feedback from experts in the fields of special education and vocational education. An Advisory Committee composed of members from both departments at various districts and the State Department of Education provided the input needed to design and implement this research.

In July, 1978, the research group met with the Advisory Committee to review initial design of the research. The Committee reviewed the interview schedules, questionnaires, budget data collection forms, procedures and goals of the project. Their recommendations were incorporated into the methodology and the procedures they suggested were followed while collecting data at each of the districts targeted for the study. A description of the target districts and the data collection methods are presented in this section of the report.

Target Districts

All districts that participated in the earlier study to develop success criteria for VEH programs (Ellis Corporation, 1977) were asked to assist in this research as well. Of the original nine, six districts agreed to

participate further. They range from a small district with one high school to a larger district of nine high schools. The districts also represent a varity of approaches to the vocational education of handicapped students, including districts that emphasize mainstreaming and districts that focus on special vocational classes. For a detailed analysis of each district's VEH program, please refer to the final report of the Success Criteria for the Vocational Education of Handicapped Students (Ellis Corporation, 1977).

Product Evaluation

The instruments and procedures used to conduct the product evaluation are discussed in this section by the four components suggested in Kim's cost-effectiveness model: 1) program description, 2) costs, 3) objectives, and 4) outputs.

VEH Program Description

To conduct a cost analysis of VEH programs, information was needed about special education programs, vocational education programs, and vocational support services for handicapped students.

Instruments. To obtain the needed information, a variety of instruments were developed by the project and administered to district staff. The instruments, two

interview schedules and three questionnaires, were used primarily for two purposes: 1) to determine the degree and nature of the respondent's involvement in providing vocational preparation for handicapped students, and 2) to identify the names and positions of other staff members who were associated with VEH. The five instruments used for this study are described below.

a. Special Education Administrators Interview Schedule (Appendix B)

   An administrator from the special education department was interviewed to determine the procedure to follow in collecting the data from their departments. The administrators were asked to identify staff involved in VEH and to suggest procedures for administering other instruments to teachers and support personnel. They were also asked who to contact for budget information and to estimate the amount of time spent on vocational education by the administrative staff (administrators, secretaries, etc.)

b. Vocational Education Administrators Interview Schedule (Appendix C). This interview was similar to the interview of special education administrators.

c. Special Education Teachers Questionnaire (Appendix D). The purpose of this questionnaire was to determine the percentage of teacher time spent on vocational education. Therefore, teachers were asked what courses they taught, the number of students contacted, and what percentage of the course time was spent on independent living skills, pre-vocational skills, and vocational skills. They were also asked if they had an aide and the amount of time spent by the aid in preparing students vocationally.

Since special education teachers spend time outside of class on vocationally related duties, such as conferences with the regular vocational teacher, they were asked how much of their time was spent in this way.

d. Vocational Education Teachers Inventory (Appendix E). Vocational teachers were asked the same questions as the special education teachers; i.e., the courses they taught, number of students, number of handicapped students, percentage of time spent on independent living skills, pre-vocational and vocational skills. They were also asked if special equipment or supplies were used for their handicapped students. Because time spent in class to provide individual instruction for handicapped students is extra time and not an intrinsic part of the program, vocational education teachers were asked how many minutes per period were spent with handicapped students beyond time required for regular students.

e. Support Staff, Special Services Inventory (Appendix F). Psychologists, counselors, work experience coordinators, and others who contributed to the vocational preparation of handicapped students were asked how many students they served, how many of these students were handicapped, and what percent of their time was spent in providing VEH services.

Data were collected for 1977-78, the last school year for which budgetary information was complete. Because detailed responses were requested, VEH staff were asked to provide information for only the most recent semester, Spring 1978.

Procedures. The staff questionnaires were piloted in two districts and revised. The methods for administering the questionnaires and conducting interviews were piloted

in one of the districts. Revisions in the process were made as a result of the pilot experience and then used as a model in researching the other districts.

A contact person at each district guided the research at every step. The contact person at the pilot district, an administrator in special education, worked closely with the research group in organizing the data collection process. Department heads at each high school were given the Special Education Teacher Questionnaire with attached cover letter and instructors for returning the questionnaire to the contact person at the district. Department heads administered the questionnaires at staff meetings. Basically the same procedure was used at the other districts. The total number of questionnaires administered to the special education teachers was 228. Of the 120 questionnaires returned 78, or 65%, indicated that vocational preparation was included in the curriculum.

When the Special Education Teacher Questionnaire was returned it was anlayzed by the research group to identify which other support staff members provided services related to VEH. The identified staff members and those recommended by the special education administrators were given the Special Services Inventory. The contact person at each district was given the inventory with the cover letter addressed to the identified counselor,

psychologist, work experience coordinator, etc. These were usually sent through district mail with instructions to be returned to the contact person at the district office.

The procedures followed to obtain information about the regular vocational education programs differed for the pilot district than for the other districts. The pilot district hired an aide to go through the class schedules of every special education student and record the vocational courses the student had completed and the teachers names. While this list was being prepared the vocational education administrator was interviewed and the Vocational Education Teacher Inventory was piloted with five teachers from that department. Based on the teacher's suggestions, the inventory was revised. The contact person then administered the inventory with a cover letter addressed to the identified teachers and a memo instructing the teachers how to return the inventory.

Of the 155 inventories sent to teachers through the high school principals, 109 were returned. Forty-eight (44%) teachers indicated they had handicapped students in their classes.

In the other target districts, the records of students were not accessible, so the contact person administered the questionnaire to every vocational education teacher.

Two hundred thirty-two inventories were administered, 117 were returned, and 41 (35%) responded that handicapped students were in regular vocational education classes.

The results of the interviews with vocational education administrators and the Vocational Education Teacher Inventory provided the information needed to prorate costs for mainstreaming handicapped students into regular vocational classes.

To determine the costs for providing support services in vocational education to handicapped students, the Special Services Inventory was administered to all identified staff. Identification was made through the administrative interviews, special education, and vocational education teacher questionnaires. These support staff members were given the Special Services Inventory through the district mail system with instructions to return the completed questionnaire to the contact person at the district office.

Staff receiving the questionnaire included counselors, psychologists, work experience coordinators and paraprofessionals, aides, and program specialists. The total number of Special Services Inventories administered was 187. Of the 187, 136 (73%) were returned and 105 (77%) of these indicated they provided VEH services.

Cost of VEH Programs

According to Kim's model, the total cost of the program divided by the unit of output equals the unit cost, or cost per student. The total cost of the program included direct and indirect costs. These direct and indirect costs for a single program such as vocational education, were ascertainable. To obtain such costs for VEH programs was complex and difficult. The costs for including vocational preparation in special education courses, the costs for mainstreaming handicapped students into regular vocational programs, and the costs for support services, such as administration, counseling, and psychological services all had to be calculated.

Special Education Costs. To arrive at the costs for VEH programs in special education the following information was required:

1. Fiscal data:
    a. Teacher salaries
    b. Aide salaries
    c. Classified salaries
    d. Supplies
    e. Equipment replacement
    f. Contracted services
    g. Staff
    h. Equipment
    i. Student transportation to training site

2. Demographic data

   a. Student ADA by handicap

   b. Number of teachers.

3. Average time teachers and aides spent in class and out of class on VEH

4. The cost per student (unit cost)

The fiscal data were obtained primarily through the State Department of Education Cost Data Report, Form J-26. The transportation costs were obtained from the district director of transportation. The figure for cost per mile was multiplied by the number of miles to and from the training site. The districts also had records of the numbers of handicapped students served which made it possible to calculate the transportation costs for students with VEH training. This information was recorded on Form 1. (See Appendix F).

The demographic data, the number of students in each of the handicapping conditions, was also taken from the J-26 form.

The average amount of time spent by teachers and aides in and out of class was derived from the Special Education Teachers Questionnaire. To determine the amount of program time spent in class on VEH the percentage of courses with VEH curriculum was figured by looking at the teaching load listed on the returned questionnaire. The

percentage of courses with independent living skills, pre-vocational skills and/or vocational skills was taken from the total number of courses that were taught to courses having no vocational training. The overall percentage of VEH courses was calculated in this way.

Once the portion of courses having VEH training was identified, it was then necessary to find out what portion of the curriculum for these courses was VEH. The percentage of independent living skills, pre-vocational skills, and vocational skills indicated on the questionnaire were totaled to determine the overall VEH involvement.

Total time spent on vocational education in special education classes was calculated as follows:

% of Courses with VEH content	X	% of Time Spent on Vocational Education	=	Total Time Spent on VEH

For example, if 50% of the special education courses had some vocational content, and the average amount of time spent on VEH was 75%, then 75% of 50% would be 38%. This would be the percent of time spent in special education classes on vocational preparation. The same calculation was performed for teacher and aide time spent outside of class.

To determine the VEH costs from the total special education program costs, the percentage of VEH course time was taken from the special education program costs. The percentage of teacher time spent outside of class on the

average was taken from the average annual special education teacher salary and the aides salaries were prorated for the average amount of time spent outside of class. The total VEH costs included the following.

1. The percent of program time on VEH taken from the special education program costs.
2. Average special education teacher and aide salaries times the percent of time spent on the average outside of class on VEH, plus
3. Transportation costs per student for off campus VEH training.

The cost per student was figured by 1) dividing the VEH prorated program costs by the number of students served, 2) adding the prorated teacher's salary for time spent on VEH outside of class divided by the average number of students per teacher, 3) adding the prorated aide's salary for time spent on VEH outside of class divided by the average number of students per aide, and 4) adding the transportation costs per student.

Vocational Education Costs. The formula in the evaluation design for obtaining costs figures for vocational education called for the following data:

1. Fiscal data
   a. Teacher salaries
   b. Instructional aides salary
   c. Clerical salaries
   d. Other classified salaries

e. Employee benefits

f. Supplies and books and media

g. Equipment replacement

h. Contracts

i. Travel

j. Equipment

2. Demographic data.

a. Number of staff members.

b. Number of students.

3. The average salary for vocational education teachers with handicapped students.

4. Extra supplies and equipment purchased for handicapped students.

5. The percentage of time teachers and aides spent in class and out of class on VEH.

6. Cost per student (unit cost).

The fiscal and demographic data was obtained from the VEA claim. The personnel office at each district assisted in determining the salary for each identified teacher and aide who served handicapped students. The average salaries for teachers aides were calculated. The cost for extra supplies and equipment purchased for handicapped students was derived from the Vocational Education Teacher Questionnaire. This information was recorded on Forms 2 and 3. (See Appendix F).

The percentage of time teachers and aides spent on VEH in and out of class was also derived from responses to the Vocational Education Teacher Inventory. The time spent in class with handicapped students (in addition to time spent with regular students) was converted from minute per period to percent of total time. The amount of time per month spent outside of class by teachers was also converted from average minutes per month to an overall percentage of teacher time. The percentages for teacher time spent inside and outside of class were added together and used as the figure for prorating salaries. The same procedure was used to prorate aide's salaries.

The total direct costs, extra supplies and equipment, and costs for time spent with handicapped students beyond time required for regular students equalled the VEH costs of the regular vocational education program.

Total Direct Costs	+	Special Supplies & Equipment	+	Extra Teacher and Aide Time	=	Total Costs for VEH (Vocational Education)

The cost per student (unit cost) was calculated by adding the cost per regular student (direct cost divided by the ADA), and the cost per handicapped student. The cost per handicapped student was the total VEA costs for regular vocational education plus the prorated salaries for teachers and aides divided by the number of students

served (obtained from the information provided by teachers on the Inventory) and the additional materials and equipment costs.

Support Services Costs. In order to prorate costs for providing VEH support services the following information was needed about support staff (e.g. counselors, and psychologists) and administrative costs:

Staff:

1. Total income and benefits for staff providing VEH.
2. Total number of students served.
3. Total number of handicapped students served.
4. Percentage of time spent with handicapped students on vocationally related topics.

Administration:

1. Total income of administrative staff involved with VEH.
2. Total number of students.
3. Total number of handicapped students served.
4. Percent of time administrative staff spent with VEH.

The salary and benefits were obtained from personnel offices. For each staff member returning the Special Services Inventory, the research team recorded the number of students they served, the number of these students who were handicapped, and the percent of their time spent on VEH. The data was recorded on Form 5 (See Appendix F).

The information needed about the administrative staff was obtained through interviews with the directors of special education and vocational education. Their salaries and the salaries of their staff involved with VEH were obtained from the personnel offices. This information was recorded on Form 4 (See Appendix F).

Objectives for VEH Programs

During the first phase of the present project, criteria for measuring the success of VEH programs were established and stated in terms of behavioral objectives. There were criteria for measuring success in preparing handicapped students to live independently; to provide pre-vocational training, e.g., filling out job applications, and interviewing for jobs; and vocational skills. The criteria were based on research conducted at eight school districts in California. These objectives were used in this study to measure program effectiveness. The Advisory Committee was responsible for assigning weights to each objective based on its relative importance. The objectives and their assigned weights are included in Appendix A.

Outputs for VEH programs

Graduates in special education for the last two years were sent the follow-up instrument (Appendix G). It

was on one sheet of paper which was to be folded and sealed for easy return. Former students were asked about their working status and other variables which were found to be related to success in the Success Criteria study (Ellis, 1977). These variables included use of public transportation, having money to spend, experience being interviewed and filling out an application at a place of business, having vocational courses in high school. Former students were asked if they had additional training after high school since the goal of many vocational programs in high school are not necessarily to prepare students for work directly out of high school, but to give them skills which get them ready for additional training.

Before follow-up questionnaires could be sent out, the following information was obtained from each district.

a. List of handicapped students who graduated in 1977 and 1978

b. Their addresses

c. Their major handicapping condition

d. Code number of each for district use

In most cases the district provided the information and the questionnaires were coded, addressed, and mailed from the district. The steps to processing each questionnaire was followed at each district.

1. Typed former students name and address on lable or questionnaire

2. Typed code numbers on return addresses after name of the person to receive completed questionnaires. The code included the district, handicap, year graduated and identification number.

3. Stamped return address with district's stamp.

4. Put stamps on envelopes for mailing and return address.

The questionnaires were sent from the districts and returned to the district. There were 560 follow-up questionnaires mailed out and 121 (22%) were returned.

Process Evaluation

The data needed for the process evaluation was the cost per student or unit cost. The program unit costs were derived for each of the following special education and vocational education programs.

Special Education

Physically Handicapped
Communicatively Handicapped
Learning Handicapped
Severely Handicapped

Vocational Education

Agriculture
Health
Home Economics
Industrial Art
Office
Trade and Industry
Vocational Work Experience

The financial data for special education programs came from the J-26 form and for vocational education programs from the VEA claim.

CHAPTER V

RESULTS OF THE FIELD TEST

The results of the field test of the evaluation model are presented in three parts: 1) results of the product evaluation, 2) results of the process evaluation, and 3) general results not directly related to the evaluation model.

Results of the Product Evaluation

The three measures in Kim's model for conducting a product evaluation 1) effectiveness, 2) cost-efficiency, and 3) cost-effectiveness, were applied to the data collected from the six districts involved in this study. The results of each measure are discussed below.

Effectiveness

Kim's formula for measuring effectiveness is as follows:

$$\text{Effectiveness Score} = \frac{\text{Output}}{\text{Target Goals}} \times \text{Weight}$$

The effectiveness scores, by objective, for all districts combined, are presented in Table I. Please refer to Appendix A for a complete list of the objectives.

As shown in the table, the target districts have have been most successful in meeting the following objectives:

TABLE I

RESULTS OF FOLLOW-UP STUDY BY OBJECTIVE

OBJECTIVE		OUTPUT	RATIO	WEIGHT	EFFECTIVENESS INDEX
1	50% SH will be able to use public transportation	69%	1.38	8	11.04
2	93% will have their own money to spend	91%	.98	6	7.83
3	25% SH will be able to figure change accurately	46%	1.84	8	14.72
4	75% PH, CH, and LH will be able to figure change accurately	73%	.97	6	5.84
5	85% will have filled out a job application	67%	.79	8	6.31
6	81% will have been interviewed	63%	.77	8	6.22
7	60% will have been evaluated at work	62%	1.03	8	8.27
8	55% will have continued training after high school	83%	1.51	4	6.04
9	65% will have been employed after one year	69%	1.06	10	10.60
10	50% SH will have been employed after one year	27%	.54	10	5.40
11	55% PH and CH will have been employed after one year	77%	1.4	10	14.00
12	75% LH will have been employed after one year	73%	.97	10	9.70
13	91% of the employed will like their jobs	84%	.92	10	9.20
COMPOSITE SCORE					115.17

Objective 3: 25% of the severely handicapped graduates will be able to figure change accurately.

Objective 11: 55% of the communicatively and physically handicapped graduates will have been employed within one year of graduation.

Objective 1: 50% of the severely handicapped graduates will be able to use public transportation.

Objective 9: 65% of the handicapped graduates will report that they have been employed within one year of graduation.

Districts were the least successful in the following areas:

Objective 10: 50% of the severely handicapped graduates will report that they have been employed within one year of graduation.

Objective 4: 75% of the communicatively, physically and learning handicapped will be able to figure change accurately.

Objective 8: 55% of the handicapped graduates will have continued training after high school.

Objective 5: 85% of the handicapped graduated will have filled out an application at a place of business.

Objective 6: 81% of the handicapped graduates will have been interviewed at a place of business.

The overall effectiveness index for the three objective categories is as follows:

Independent Living Skills:	9.86
Pre-vocational Skills:	6.93
Vocational Skills:	9.16

From these results it appears that the target districts are weakest in providing handicapped students with pre-vocational skills.

Cost Efficiency

The program unit cost must be determined before the cost-effectiveness ratio can be calculated. As discussed in Chapter III, Kim's cost efficiency formulas for vocational education programs were adapted for VEH programs. The data presented below represents the cost per student, or unit cost, for special education, vocational education, and support services. These three costs, added together, represent the total unit cost for VEH programs.

VEH Special Education Unit Cost. The formula used to calculate the unit cost for special education is as follows:

$$\text{Unit Cost for VEH Special Education Programs} = \frac{[\%\ \text{Course Time on VEH}]\ [\text{Special Education Program Costs}]}{\#\ \text{Students Served}} + \frac{[\%\ \text{Teacher Time Spent Outside Class}]\ [\text{Average Annual Teachers Salary}]}{\#\ \text{Students/Teacher}} + \frac{[\%\ \text{Aide Time Outside Class}]\ [\text{Average Annual Aide Salary}]}{\#\ \text{Students Served/Aide}} + \frac{\text{Transportation Costs}}{\#\ \text{Students Transported}}$$

Each component of this formula is discussed briefly below:

1. Percent Course Time on VEH: Results from the Special Education Teacher Questionnaire show that 71% of the special education courses have some vocational content. Teachers who include vocational curriculum in their classes also reported that 74% of their course time is

spent in this area, including 35% on independent living skills, 28% on pre-vocational skills, and 11% on vocational skills. The percentage of time in special education classes that was devoted to vocational preparation was calculated as follows: 74% X 71% = 53%

2. Special Education Program Costs: Total special education program costs for all six districts, excluding teacher salaries, equalled 5,791,831. Fifty-three percent (53%) of this figure equals the total special education costs for VEH, or $ 3,069,670.43.

3. The average amount of time spent outside of class was 23 minutes per month or 230 minutes a year. At eight hours per day for 180 days, a teaching year, teachers work 1440 hours per year. Two hundred thirty minutes is .27% of 1440 hours a year. To calculate the cost for time spent outside of class on VEH business, .27% was taken of the average yearly salary for teachers indicating they taught vocational education to handicapped students.

4. Annual Teacher Salary: The annual salary for special education teachers teaching vocational curriculum was $ 18,049.03. The average amount alloted for the time spent outside of class ON VEH related business was $ 48.73 (.27% of $ 18,049.32). The average amount of time per year reported for aides on VEH outside of class was less than 30 minutes per year. Because this cost would be so minute it was eliminated from the formula.

5. Number of Students: The total ADA given for the districts in the project was 2,439.23 students. The average number of student contacts per teacher was 22.18.

6. Transportation Costs: The total cost for transporting students to vocational training sites was $ 21,242.08. There were 119 students who received the services.

Using this data, the unit cost formula for special education is given below:

$$\text{Unit Cost for VEH Special Education Programs} = \frac{\$3,069,670.43}{2439.23} + \frac{\$48.73}{22.18} + \frac{\$21,242.08}{119} =$$

$$\$1,258.46 + \$2.20 + \$178.50 = \$1,439.16$$

The unit cost for providing vocational preparation in special education programs was $ 1,439.16 per handicapped student.

Vocational Education Unit Cost. The formula for determining the unit cost for handicapped students who were mainstreamed into the regular vocational education programs was adapted as follows:

$$\text{Unit Cost for VEH Vocational Education Programs} = \text{Average Cost Per Student} + \frac{[\text{\% of Teachers Time Demand In \& Outside of Class}][\text{Average Annual Teacher Salary}]}{\text{Average Number Handicapped Students Per Teacher}} + \frac{[\text{\% of Aide Time Demand In \& Outside of Class}][\text{Average Annual Aide Salary}]}{\text{Average Number Handicapped Students Per Aide}} + \frac{\text{Extra Supplies and Equipment}}{\text{Number Handicapped Students Served}}$$

The components of this formula are discussed below:

1. Mean Cost Per Student: The cost per student was figured for each district individually, and then the individual district costs per student were averaged. The cost per student ranged from $ 803.04 in one district to $ 1,136.77 in another. The average was $ 955.89.

2. Percent of Teacher Time Demanded In Class and Outside of Class: The average time spent in class by vocational education teachers was six minutes per period or 6.25% extra for handicapped. Six minutes times five periods equals 30 minutes extra per day. Figuring 480 minutes per day (eight hours times 60 minutes) 30 minutes is 6.25% of a teachers day. The average response to the questionnaire indicating the amount of time spent outside of class each month was one hour or .69% of a teacher's time. One hour per month for ten months equals 10 hours per year. One teaching year is 180 days, and at eight hours per day that totals 1,440 hours for the year. The ten hours outside of class per year divided by the 1440 hours teaching per year is .69% of a teachers time. The in-class percentage added to the out-of-class percentage is a total of 6.94% of the teachers allotted to the handicapped.

3. Average Annual Salary for Teachers: The average salary for teachers with handicapped students was $ 19,626 per year.

4. Percent Aide Time Demand in Class and Outside of Class: The average time spent by aides in assisting handicapped students was 13 minutes per period. The average amount of time worked by aides was 4 hours a day, 240 minutes, or four periods a day. Thirteen minutes per period times four periods equals 52 minutes per day. Fifty-two minutes divided by 240 minutes a day is 22% which is the percentage of time on the average spent by aides with handicapped students beyond the time required of regular students. Twenty-two percent (22%) of the average annual salary for aides equals the proportion of an aides salary that goes to the handicapped.

5. Average Number of Students Per Teacher: Teachers indicated on the Vocational Education Teachers Inventory the number of handicapped students per class. The average number of handicapped students for teachers with handicapped students was 14.04 students.

6. Average Annual Aide Salary: The average annual salary for aides in regular vocational classes with handicapped students was $5,316.

7. Average Number of Handicapped Students for Aides: Aides worked in four classes per day, and the average number of handicapped students per class was 2.81. Aides therefore served an average of 11.24 handicapped students.

8. Extra Supplies and Materials: Although regular vocational education teachers indicated the need for additional supplies and equipment, they stated that none were available. Therefore no additional equipment or supply costs were calculated for handicapped students in regular vocational programs.

This data incorporated into the formula for computing the unit cost for VEH programs in regular vocational departments is given below:

$$\text{Unit Cost for VEH Vocational Education Programs} = \$955.89 + \frac{(6.94\%)\ (\$19,626)}{14.04} + \frac{(22\%)\ (5,316)}{11.24} + 0 =$$

$$\$955.89 + \frac{1362.04}{14.04} + \frac{1169.52}{11.24} =$$

$$\$955.89 + 97.01 + 104.05 = \$\ 1,156.95$$

The unit cost in vocational education for providing services to a handicapped student was $ 1,156.95. The unit cost for a regular student was $ 955.89. Additional teacher time ($ 97.01) and aide time ($ 104.05) account for the difference in cost.

* 29% of the teachers had aides. The VEH cost per student when there was an aide was indicated because almost one quarter of an aides time was with VEH students.

Support Services Unit Cost: The formulas adapted from Kim to determine the VEH support services costs were calculated for both support and administrative staff. These formulas are as follows:

Support Staff Formulas:

a. Total Salaries X $\frac{\text{\# Handicapped}}{\text{\# Students}}$ = Prorated Salaries for Services to the Handicapped

b. $\frac{\text{Prorated Salaries}}{\text{\# Handicapped}}$ = Cost Per Handicapped Student

c. Cost Per Handicapped X Percent Time on VEH = VEH Staff Support Services Unit Cost

Administrative Staff Formulas:

a. Total Salaries X $\frac{\text{\# Handicapped}}{\text{\# Students}}$ = Prorated Salaries for Services to the Handicapped

b. $\frac{\text{Prorated Salaries}}{\text{\# Handicapped}}$ = Cost Per Handicapped Student

c. Cost Per Handicapped X Percent Time on VEH = VEH Administrative Support Services Costs

STAFF UNIT COST + ADMINISTRATIVE UNIT COST = UNIT COST FOR SUPPORT SERVICES

The components of these formulas are discussed below:

1. Staff Total Income: The income for the psychologist, counselors, work experience counselors, libarians and others who provided VEH Services totaled $ 1,535,135.

2. Staff Number Handicapped: Staff members indicated they provided services to a total of 4,496 handicapped students. See Table II for a breakdown of support services by handicap condition.

TABLE II

THE NUMBER OF HANDICAPPED STUDENTS
SERVED BY SUPPORT STAFF

Handicap	Counselor (n=32)	Psychologists (n=19)	Career (n=9)	Program Specialist (n=5)	Total (n=65)
PH	260	388	24	231	903
CH	19	53	22	9	103
LH	450	1426	209	1250	3335
SH	-0-	51	4	100	155
TOTAL	729	1918	259	1590	4496

3. Number of Students: The total number of student contacts by support staff was 34,993.

4. Prorated Salaries for Services to Handicapped: The portion of the total staff salaries which is the same as the proportion of handicapped students to the students served by the staff. Since 13% of their students were handicapped, the proportion of staff salaries allotted to the handicapped was $ 199,568.

5. Cost Per Handicapped Student: There were 4,496 handicapped students served, so the cost per handicapped student was $ 44.39.

6. Percent Time on VEH: To determine the proportion of the total cost per handicapped students which was appropriated for VEH, the percent of time spent on VEH, was multiplied by $ 44.39, or the cost per student. The a-erage was 15% of their time, or $16.66 per student.

7. Total Income for Administrators: The income for administrators and office staff involved with VEH in special education and vocational education was $ 575.906.

8. Number Handicapped: Administrators in special education indirectly served all handicapped students. The number of handicapped students (ADA) was 2,439.23.

9. Number Students: Administrators in vocational education indirectly served all students in vocational education, which was 4,893.2 (ADA). The total number of students served by administrators in special education and vocational education was 7382.43.

10. Prorated Salaries for Services to Handicapped: The total number of students served by vocational and special education administrators was 7,332.43. The handicapped students were 33% of the total number of students served; therefore, 33% of the total administrators intome was proportion to the handicapped.

11. Cost Per Handicapped: The proportion of the handicapped, divided by the number of handicapped was the cost per handicapped. Since there were 2439.23 handicapped students, the administrative cost per handicapped student was 77.91.

12. Percent of Administrative Time on VEH: During the interviews with administrators, the amount of time they and their staff spent on VEH was established. Each person's income was prorated by the percent of time they spent on VEH and the prorated salaries were added to obtain the total cost of $ 52,457. This figure is 9.1% of the total income for administrators and staff.

13. VEH Support Services Unit Cost: The administrative cost per handicapped student was found to be $ 77.91. To determine which portion of that cost per student was allocated to VEH services, $ 77.91 was multiplied by 9.1%. The VEH administrative support services unit cost was $ 7.09.

The unit cost for support services is calculated below using the staff and administrative formulas.

Staff:

$$\text{Total Income} \times \frac{\text{\# Handicapped}}{\text{\# Students}} = \text{Prorated Salaries Handicapped}$$

$$\$\,1{,}535{,}135 \times \frac{4{,}496}{34{,}993} = \$\,199{,}568$$

$$\frac{\text{Prorated Salaries}}{\text{\# Handicapped}} = \text{Cost Per Handicapped}$$

$$\frac{\$199{,}568}{4499} = \$\,44.39$$

$$\text{Cost Per Handicapped} \times \text{\% Time on VEH} = \text{Staff Support Services Unit Cost}$$

$$\$\,44.39 \times 15\% = \$\,6.66.$$

Administration:

Total Income X $\frac{\text{\# Handicapped}}{\text{\# Students}}$ = Prorated Salaries Handicapped

$575,906 X $\frac{2439.23}{7332.43}$ = $190,049

$\frac{\text{Prorated Salaries}}{\text{\# Handicapped}}$ = Cost Per Handicapped

$\frac{\$190,049}{2439.23}$ = $77.91

Cost Per Handicapped X % Time on VEH = VEH Staff Support Services Unit Cost

$77.91 X 9.1% = $7.09

Staff Unit Cost + Administrative Unit Cost = Unit Cost for Support Services

$6.66 + $7.09 = $13.75

The unit cost for providing vocational support services to handicapped students was $13.75 per handicapped student.

In a composit of six districts the cost efficiency for providing vocational education to the handicapped was $1,699.53.

Composit Unit Cost	=	VEH Special Education Unit Cost	+	VEH Vocational Education Unit Cost	+	VEH Support Services Unit Cost
$1,699.53		$1,482.72		$201.06		$13.75

Cost Effectiveness

The formula for computing cost effectiveness is as follows:

$$\text{Cost Effectiveness Ratio} = \frac{\text{Effectiveness Index}}{\text{Unit Cost}} = \frac{115.17}{\$1,699.53} = .068$$

The cost effectiveness ratio which relates the cost of a program to the program's effectiveness was .068 The index of .068 is a relative index which can be used by districts as a reference point. It is a composite of six districts, thereby establishing a norm which other districts can relate to when conducting a cost analysis of their VEH programs.

Results of the Process Evaluation

The data needed for the process evaluation was the unit cost for the programs in special education and the unit cost for programs in vocational education. The programs included in the process evaluation from special education were 1) physically handicapped, 2) communicatively handicapped, 3) learning handicapped, and 4) severely handicapped. The programs included in the process evaluation of vocational education included 1) agriculture; 2) home economics occupations and consumer education

3) office, 4) trade and industry, and 5) vocational work experience. *

Special Education

The unit cost for the four programs in special education were based on Kim's cost-efficiency formula. The information called for by the adapted formula included 1) percent of time teachers spent on VEH in that program, 2) the costs for each of the four programs, 3) the percent of time the teacher spent outside of class on VEH, 4) the average salary for teachers in each of the programs, 5) the number of students served in the program, 6) the average number of students served by each teacher, 7) the transportation costs for VEH training, and 8) the number of students transported.

The data for the six districts in the study was consolidated and the following results were found:

	Physically	Communicatively	Learning	Severely
% Time on VEH	66	69	62	36
Program Costs	466,652	291,487	3,934,013	1,099,679
% Time Out Side Class	1.4	2.6	1.4	4.1
Average Salary for Teacher	17,954	17,503	18,159	18,925

* There were too few students in distribution, health, or industrial arts classes to include an analysis in this project.

	Physically	Communicatively	Learning	Severely
Number of Students Served	339.5	87.11	1,656.62	356
# Students Served Per Teacher	8.90	16.29	32.65	30.44
Transportation Costs	1365.76		16,414.40	1,877.92
Number of Students Transported	5		77	37

The adapted formula for computing the VEH unit cost in special education was:

$$\text{Unit Cost for VEH Special Education Programs} = \frac{[\%\ \text{Course Time on VEH}]\,[\text{Special Education Program Costs}]}{\#\ \text{Students Served}} + \frac{[\%\ \text{Time Spent Outside Class}]\,[\text{Average Salary For Teachers}]}{\#\ \text{Students Per Teacher}} + \frac{\text{Transportation Costs}}{\#\ \text{Students Transported}}$$

Using this formula to compute unit costs for each of the programs for handicapped students, the following results were obtained:

Physically Handicapped:

$$\text{Unit Cost} = \frac{307990.32}{339.5} + \frac{251.23}{890} + \frac{1365.76}{5} = \$1,208.57$$

Communicatively Handicapped:

$$\text{Unit Cost} = \frac{201126.03}{87.11} + \frac{455.08}{16.29} = \$2,336.81$$

Learning Handicapped:

$$\text{Unit Cost} = \frac{395884.44}{1656.62} + \frac{254.23}{32.65} + \frac{16414.40}{77} = \$1,693.29$$

Severely Handicapped:

$$\text{Unit Cost} = \frac{395884.44}{356} + \frac{775.93}{30.44} + \frac{1877.92}{37} = \$1,188.29$$

In summary, the unit costs in each of the special education programs were as follows:

Physically	Communicatively	Learning	Severely
$1,208.57	$2,336.81	$1,693.29	$1,188.29

Each of these unit costs represent the cost-efficiency for providing vocational education to physically, communicatively, learning, and severely handicapped students.

Vocational Education:

The data that was needed in the cost-efficiency formula adapted from Kim for vocational education included: 1) average cost per student in the vocational education program, 2) percent of time teacher spent in class on handicapped students in addition to the time spent for regular students, 3) time spent outside of class on VEH related business, 4) average annual teacher salary, 5) the average number of handicapped students per teacher, 6) percent of time aide spent in class for handicapped students in addition to the time spent for regular students.

TABLE III

DATA FOR CONDUCTING THE COST EFFICIENCY ANALYSIS

DATA	AGRICULTURE	HOME ECONOMICS	OFFICE	TRADE AND INDUSTRY	WORK EXPERIENCE
Cost Per Student	1,305.53	593.24	858.58	1,500.94	1,097.33
Percent Time In Class	10.42	9.38	9.38	7.29	9.38
Percent Time Outside of Class	1.04	1.04	.59	.52	1.40
Average Teacher Salary	17,380.00	16,289.00	19,975.00	19,618.00	18,080.00
Average # Handicapped Students/ Teachers	22.5	12.12	18.53	12.35	14
Aide Time In Class	No aides	11.67	8.33	-0-	5%
Average Number Handicapped Student/Aide	No aides	9.7	14.82	-0-	11.2

This data was required to generate the VEH unit cost for each of the vocational programs. The composite results from the six districts for each of the categories listed above are presented in the following table.

The formula adapted form Kim's cost-efficiency measure for vocational education programs was:

$$\text{Unit Cost for VEH Vocational Education Programs} = \text{Average Cost Per Student} + \frac{\left[\begin{array}{c}\text{\% Teachers Time Demand In and Out of Class}\end{array}\right]\left[\begin{array}{c}\text{Average Annual Teacher Salary}\end{array}\right]}{\text{Average Number of Handicapped Students Per Teacher}} + \frac{\left[\begin{array}{c}\text{\% Aide Time Demand In Class}\end{array}\right]\left[\begin{array}{c}\text{Average Annual Aide Salary}\end{array}\right]}{\text{Average Number Handicapped Students Per Aide}}$$

This formula applied to the data described above yields the following results for vocational programs:

Agriculture:

$$\text{Unit Cost} = \$1,305.53 + \frac{(11.46\%)(\$17,380)}{22.50} = \$1,305.53 + 146.55 = \$1,452.08$$

Home Economics:

$$\text{Unit Cost} = \$593.24 + \frac{(10.42\%)(\$16,289)}{12.12} + \frac{(11.67\%)(\$5,316)}{9.7} =$$

$$\$593.24 + 140.04 + 63.96 = 797.24$$

Office:

$$\text{Unit Cost} = 858.58 + \frac{(9.97\%)(\$19,975)}{18.53} + \frac{(8.33\%)(\$5,316)}{14.82} =$$

$$858.58 + 107.47 + 29.88 = \$\ 995.93$$

Trade and Industry:

$$\text{Unit Cost} = \$1,500.94 + \frac{(7.81\%)(\$19,618)}{12.35} = \$1,500.94 + 124.06 = \$1,600$$

Work Experience:

$$\text{Unit Cost} = \$1,097.33 + \frac{(10.78\%)(\$18,080)}{14} + \frac{(5\%)(5316)}{11.2} =$$

$$\$1,097.33 + 139.22 + 23.73 = \$1,260.28$$

The unit cost for VEH programs in vocational education are summarized below:

Agriculture	Home Economics	Office	Trade & Industry	Work Experience
$1,452.08	$ 797.24	$995.93	$1,600	$1,260.28

General Results

There were responses to the questionnaires used in this study which were not directly related to the product or process evaluation. These results which were not presented earlier are described here. These results are organized by the questionnaire used in conducting the research.

Follow-Up:

Former students were asked who they lived with, parents, spouse, friend, or themselves. Since questionnaires were sent to the last known address of high school seniors they went to the parent's house. Those former students responding to the questionnaire were in most cases still

living at that address. Those who are not living at that address simply did not receive the questionnaire and therefore did not respond. It really doesn't make sense then to ask about the living situation of the students because the only ones who responded to the questionnaire were still living at home with their parents. For the same, or least similar reasons, former students did not indicate that they were married, or were getting married soon, or that they were in the military. It is recommended that these alternatives not be included in the follow-up instrument sent to the parent's home.

Teacher Questionnaires:

As indicated previously, vocational education teachers responded that there were fewer (or none at all) handicapped students in their classes than they actually had. There are two arguments which address this issue; 1) regular classroom teachers should not know that a student is handicapped if the student is to be truly mainstreamed, and 2) if a student is to be successfully mainstreamed, the regular teachers should have all the support possible. The regular teachers in vocational education who indicated that there were handicapped students in their classes had an average of 14 handicapped students on their rolls. That means that the teachers who do accept the special students have approximately three

handicapped students in every class (that they are aware of). The burden is on the teacher alone to meet the particular needs of these students. Previous research has shown that regular vocational education teachers indicate that they are individualizing their courses, but the handicapped students fail to reach objectives (Ellis, 1977). Obviously the teachers who are providing vocational instruction to handicapped students require more support if these students are to reach the objectives for the regular courses.

An additional finding relevant to the mainstreamed student is that none of the teachers from six districts in southers California responded that they had received inservice training in providing vocational education for handicapped students; i.e., neither special education or vocational education teachers had received such training. With an increasing emphasis on providing the least restrictive environment for handicapped students, it is imperative that teachers be trained to effectively teach this population of students.

The results of this research show a clear need to provide inservice training for both the special education and the vocational education teachers if they are to successfully place and provide follow-up support for handicapped students mainstreamed into regular vocational

education programs. The district in this study which had the most graduates working was also the district which had the highest rate of mainstreaming. It is reasonable to expect that with much needed inservice training the rate of employment of graduates could be increased.

The average time spent outside of class on VEH business was one hour per month for vocational education teachers, and 23 minutes per month for special education teachers. These results show some interest on the part of the regular vocational teacher in the unique needs of the handicapped students in their class. With inservice training and increased communication with special education staff members, it is likely that the students would benefit.

As result of the follow-up questionnaire sent to former students, one district received the letter included in Appendix 13. That letter is presented here for no reason other than it is evidence of the value of vocational education for at least one handicapped student.

Summary of Results for the Six Target Districts

The three measures used to reach the C/E Ratio were calculated for each of the six target districts in this study and are presented below to give a range of normative references.

Effectiveness Index:

The effectiveness index was the composite of all the effectiveness scores multiplied by their respective weights. The effectiveness indexes for the six target districts ranged as follows:

a. 54.85
b. 59.36
c. 77.02
d. 96.22
e. 111.86
f. 123.16

The combined effectiveness index for all the districts was 115.17.

Unit Cost for VEH Programs:

In order to calculate the unit cost for VEH programs at each district it was necessary to determine the unit cost (cost per student) for VEH programs in special education, vocational education and support services and then combine them. The range of VEH unit costs for each of these programs and the total for the six districts is presented in Table IV.

TABLE IV

VEH COSTS FOR THE SIX
TARGET DISTRICTS

District	Special Education	Vocational Education	Support Services	Unit Cost For VEH Programs
f	$ 760.19	$ 100.28	$ 55.71	$ 916.18
b	1011.11	115.31	24.36	1150.78
c	1426.71	68.45	9.17	1504.33
a	1559.92	349.00	17.21	1926.13
d	1794.27	215.10	16.79	2026.16
e	2025.99	368.05	2.65	2396.69

Cost Effectiveness Ratio

The relationship between the cost per student and the effectiveness of a program in reaching its goals was determined by dividing the effectiveness index by the unit cost. The range of the Cost Effectiveness Ratios are presented below for the six target districts (each cost effectiveness ratio has been multiplied by 100):

a. 2.9
c. 3.2
d. 4.7
b. 5.2
e. 7.4
f. 13.4

The cost effectiveness ratio for the districts when combined was 6.8. This figure represents the degree of goal attainment per unit cost.

The district with the highest cost effectiveness ratio had several distinct characteristics. It had the lowest cost per student in special education; the second lowest cost per student in vocational education; the highest cost per student in providing support services; the highest percentage of administrative involvement by the vocational education department; the highest paid special education teachers and vocational education teachers; the greatest number of handicapped students mainstreamed into vocational education courses; the highest average of credits earned in vocational education by handicapped students; the second lowest average of units earned in work experience*; and the highest percentage

* Data from the Ellis (1977) study.

of graduates who were working within the first year after leaving school.

The results of this district support the concept that it is important to evaluate VEH programs not only by the cost for the programs, but also by the effectiveness of the program.

CHAPTER VI
SUMMARY OF FINDINGS

Program Effectiveness

1. Measuring target goals against district outputs, the six target districts were found to be most successful in the following areas:

	Effectiveness Index
Objective 3: 25% of the severely handicapped graduates will be able to figure change accurately	14.72
Objective 11: 55% of the communicatively and physically handicapped graduates will have been employed within one year of graduation.	14.00
Objective 1: 50% of the severely handicapped graduates will be able to use public transportation	11.04
Objective 9: 65% of the handicapped graduates will report that they have been employed within one year of graduation.	10.60

Target districts were least successful in the following areas:

Objective 10: 50% of the severely handicapped graduates will report that they have been employed within one year of graduation.	5.40
Objective 4: 75% of the communicatively, physically and learning handicapped will be able to figure change accurately.	5.84
Objective 8: 55% of the handicapped graduates will have continued training after high school.	6.04
Objective 5: 85% of the handicapped graduates will have filled out an application at a place of business.	6.31
Objective 6: 81% of the handicapped graduates will have been interviewed at a place of business.	6.22

2. The overall effectiveness index for the three objective categories is as follows:

Independent Living Skills	9.86
Pre-vocational Skills	6.93
Vocational Skills	9.16

3. There was a wide range of effectiveness indices among the six target districts:

a. 54.85
b. 59.36
c. 77.02
d. 96.22
e. 111.86
f. 123.16

Cost Efficiency

1. The overall unit cost, or cost per student and the range among the six districts was calculated to be as follows:

	OVERALL	RANGE
a. Special Education	$1,439.16	760.19 - 2025.99
b. Vocational Education	1,156.95	
Regular Student in Vocational Education	955.89	1056.17 - 123.94
c. Support Services (e.g., counselors, psychologists specialists, administration, etc.	13.75	2.65 - 55.71

Additional teacher and aide time account for the difference in cost between a handicapped student and a regular student in vocational education. In special education, transportation costs and the lower teacher/pupil ratio account for the higher cost per student.

2. The unit cost for each vocational education program was calculated to be as follows:

1.	Agriculture	1,452.08
2.	Home Economics	797.24
3.	Office	995.93
4.	Trade & Industry	1,600.00
5.	Work Experience	1,260.28

3. The unit cost for each special education program was calculated to be as follows:

1.	Learning Handicapped	1,693.29
2.	Physically Handicapped	1,208.57
3.	Communicatively Handicapped	2,336.81
4.	Severely Handicapped	1,888.29

Cost Effectiveness

1. The overall cost effectiveness ratio, determined by dividing the composite effectiveness index by the cost per student for VEH equals .068 or 6.8 (when multiplied by 100). This figure represents a norm for the six target districts and can be used by other districts when they are conducting a cost effectiveness analysis.

2. The range of cost effectiveness ratios for the six target districts are as follows:

a. 2.8
c. 3.2
d. 4.7
b. 5.2
e. 7.4
f. 13.4

General Findings

1. 71% of all special education courses have some vocational content.

2. Of all special education courses with a vocational content, 35% of the time is spent on independent living skills, 28% on pre-vocational skills, and 17% on vocational skills.

3. Vocational Education teachers spent six extra minutes per period with handicapped students. Aides spent 13 extra minutes per period with handicapped students.

4. Vocational Education teachers spend an average of one hour per month outside of class on VEH business. Special Education teachers spend 23 minutes per month outside of class on VEH business.

5. Support staff (counselors, psychologists, work experience coordinators, paraprofessionaks, and program specialists) spent 15% of their time on VEH.

6. Directors of Special Education and Vocational Education spent an average of 9% of their time on VEH. This ranges from a high of 28% to a low of 2% for Vocational Education Directors and their staff and a high of 52% to a low of 10% for Special Education Directors and their staff.

7. Although vocational education teachers indicated the need for additional supplies and equipment for mainstreamed students, they stated that none were available. Therefore, additional equipment and supplies for mainstreamed students were not calculated as part of the per pupil cost.

8. 35% of the vocational education teachers report that they have mainstreamed students in their classes. However, in one district used to pilot data collection procedures, 56% of the teachers were unaware that they did in fact have handicapped students in their classes. It is likely therefore that the actual number of teachers with mainstreamed students is much higher than 35%.

9. In the past two years, none of the vocational education or special education teachers in the six target districts have received inservice training in providing vocational education to handicapped students.

Appendix

Appendix A

PROGRAM OBJECTIVES

Independent Living Skills	Weight
1. 50% of the severely handicapped graduates will be able to use public transportation.	8
2. 93% of the handicapped graduates will have their own money to spend.	6
3. 25% of the severely handicapped graduates will be able to figure change accurately.	8
4. 75% of the communicatively, physically and learning handicapped graduates will be able to figure change accurately.	6
Pre-Vocational Skills	
5. 86% of the handicapped graduates will have filled out an application at a place of business.	8
6. 81% of the handicapped graduates will have been interviewed at a place of business.	8
7. 60% of the handicapped graduates will have participated in a working environment which was used by the high school instructors to continuously evaluate and instruct students in peer relationships while working.	8

Employment	Weight
8. 55% of the handicapped graduates will have continued training after high school.	4
9. 65% of the handicapped graduates will report that they have been employed within one year of graduation.	10
10. 50% of the severely handicapped graduates will report that they have been employed within one year of graduation.	10
11. 55% of the communicatively and physically handicapped graduates will have been employed within one year of graduation.	10
12. 75% of the learning handicapped graduates will have been employed within one year of graduation.	10
13. 91% of the employed or recently employed handicapped graduates will like their jobs.	10

Appendix B

DIRECTOR OF SPECIAL EDUCATION
INTERVIEW SCHEDULE

1. Please list all special education teachers who taught courses during the 1977-78 school year which included independant living skills, pre-vocational skills, and/or vocational skills in the curriculum. These topics may be part of a course or the subject of the entire course. Also please indicate where the teachers are located this year so that we can contact them.

TEACHER'S NAME	SCHOOL	TEACHER'S NAME	SCHOOL

2. Please list the name, position, and next year's location of those staff members who can tell us where each handicapped student was placed in courses/programs which include independent living skills, pre-vocational skills, and/or vocational skills, for the 1977-78 school year. (This may include one teacher at each grade level responsible for the special education students, homeroom teachers, etc.)

NAME	POSITION	LOCATION(SCHOOL)

3. What special services do handicapped students receive related to their vocational education and who should be contacted regarding these services? Also please indicate where the person can be reached.

SERVICES RECEIVED	PERSON TO CONTACT	LOCATION
Career Counseling	_____	_____
	_____	_____
	_____	_____
Assessment and Evaluation	_____	_____
	_____	_____
	_____	_____
Tutoring in Class	_____	_____
	_____	_____
	_____	_____
Tutoring in Resource Room	_____	_____
	_____	_____
	_____	_____
Itinerant Teacher	_____	_____
	_____	_____
	_____	_____
Interpretor for Deaf and Hard of Hearing	_____	_____
	_____	_____
	_____	_____
Mobility Training	_____	_____
	_____	_____
	_____	_____

3 (continued)

SERVICES RECEIVED	PERSON TO CONTACT	LOCATION
ROP Coordinator	_____	_____
	_____	_____
	_____	_____
Other (Please Specify)	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____

4. Does the district provide transportation to or from vocational programs?

   Yes_____ No_____

   4a. If yes, which of the following transportation services does the district provide for vocational programs for handicapped students and what percentage of the transportation budget is for this purpose?

TRANSPORTATION SERVICE	(✓)	PERCENTAGE OF TRANSPORTATION BUDGET
From Home To School	____	_____
From School to a School (or district) vocational program	____	_____
From School (or home) to an outside (contracted) vocational program	____	_____

5. If there is a contracted program, what is the program(s)?

   Department of Rehabilitation_____

   _____

   _____

5. (Continued)

Independent Living Skills Training_____

_____

_____

Mobility Training_____

_____

_____

Other (Please Specify)_____

_____

_____

6. What conditions do you find limit the district from providing vocational programs for handicapped students.

_____

_____

_____

_____

7. What resources are needed to achieve your objectives?

_____

_____

_____

_____

8. What resources are unavailable?

_____

_____

_____

_____

9. Where would we get the following information?

9a. Budget for special education and vocational education._____

_____

9b. Square footage of building to determine space used for vocational education of handicapped students.

_____

_____

10. What statistics are available by school/district for each of the following (1977-78) by the handicapping conditions:

	PHY	COMM	LRN	SEV
# of students				
Males				
Females				
# of students				
9th				
10th				
11th				
12th				
Continuing				
Independent Living Skills Courses				
# enrolled				
Mainstreamed				
Special Education				
# completed				
Mainstreamed				
Special Education				
Pre-vocational Courses				
# enrolled				
Mainstreamed				
Special Education				
# completed				
Mainstreamed				
Special Education				

10. (Continued)

Vocational Courses

enrolled
Mainstreamed
Special Education

completed
Mainstreamed
Special Education

PHY	COMM	LRN	SEV

11. Would you please estimate the percentage of your time that you spend on the vocational education of handicapped students _____ %

12. Please estimate the percentage of total working time spent by each member of your administrative office staff concerning the vocational education of handicapped students (include other administrators, secretaries, clerks, and support staff).

NAME	POSITION	% OF TIME

13. Could you please provide us with copies of the following:

a. Description of vocational courses (e.g. high school catalogue).

b. Any prepared literature describing the district's vocational education program for handicapped students.

Appendix C

DIRECTOR OF VOCATIONAL EDUCATION
(INTERVIEW SCHEDULE)

1. Please estimate the percentage of your total working time that you spent on the vocational education of handicapped students.

   _____

2. Please estimate the percentage of total working time spent by each member of your staff concerning the vocational education of handicapped students (include secretaries, clerks, etc.)

NAME	POSITION	% OF TIME
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

3. Please list those vocational education teachers who had mainstreamed students during the 1977-78 school year and indicate where we can locate them this year.

TEACHER	CLASS	SCHOOL LOCATION
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

4. What conditions do you find limit the district from providing vocational programs for handicapped students?

5. What resources are needed to achieve your objectives?

6. What resources are unavailable?

7. What special services did the handicapped students receive and who provided the services? Where can these people be found?

Service	Person	Location
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

8. Could we have copies of budgets for vocational education showing the following for handicapped related courses/ programs?

   a. Teachers, aides, and administrator's and instructional support salaries
   b. Instructional supplies and materials
   c. Contracted services
   d. Inservice training
   e. Trasportation (salaries, maintenance, gas and oil)
   f. Equipment (new, repair, replacement)
   g. Special projects budget (when applicable)
   h. Building use cost (utilities, heat, custodial)

Appendix D

SPECIAL EDUCATION TEACHER
QUESTIONNAIRE

Please keep in mind that the critical information needed in this questionnaire concerns those classes/programs which you taught in the spring of 1978, which included in part, or wholly, independent living skills, pre-vocational, or vocational skills in the course content.

1. Your Name:_____

2. District: Spring, '78:_____

3. School: Spring, '78:_____

4. Please estimate what additional demands were made on your time outside of class each month regarding the vocational education of handicapped students (including independent living skills, pre-vocational, and vocational skills). This may include such activities as meeting with vocational education teachers of mainstreamed students and assessing students vocational abilities.

   No Time_____ 1 - 15 Minutes_____ 16 - 30 Minutes_____

   31-45 Minutes____ 46 - 60 Minutes_____ 1 - 2 Hours_____

   3 - 4 Hours_____ 5 - 10 Hours_____ 11 - 20 Hours_____

   More than 20 Hours_____

5. If you had an aide, would you please estimate the amount of time each month the aide spent outside of class on vocationally related objectives.

   No Time_____ 1 - 15 Minutes_____ 16 - 30 Minutes_____

   31-45 Minutes____ 46 - 60 Minutes_____ 1 - 2 Hours_____

   3 - 4 Hours_____ 5 - 10 Hours_____ 11 - 20 Hours_____

   More than 20 Hours_____

6. Did you attend any inservice training sessions for teaching independent living skills, pre-vocational skills, or vocational skills during the summer of '77 to the present?

   Yes_____ No_____

   6a. If yes, were you paid in addition to your salary?

   Yes_____ No_____

6b. Did you receive college credits for the inservice?

Yes_____ No_____

7. Do you know of any district services which your students have in helping them obtain their vocational education, in and out of the classroom; e.g. interpretor).

Yes_____ No_____

If yes, please list below the services students have received and the name, if known, of the individual providing the services.

SERVICE RECEIVED	NAME OF SERVICE WORKER

8. How many students are you responsible for as the students' advocate or homeroom teacher where you oversee the students' basic IEP and see to it that everyone does their part?

_____students

9. Reflecting on your school schedule for last semester, spring, 1978, please fill in the following information for each class period:

Column 9.1: Write in the titles of the courses by periods you taught last semester.

Column 9.2: Indicate the number of days per week that the course met for each course listed in column 9.1.

Column 9.3 thru 9.9: For each class period indicate the proporation of the course curriculum that includes independent living skills, pre-vocational skills, and/or vocational skills; the number of students enrolled and completing a course; and whether there was an aide available for the course.

	9.1 Title Of Course (Write In)	9.2 # Days Per Week Course Met	9.3 Please Check (✓) % of Time Spent On Independent Living Skills					9.4 Pre-vocational				
			0	1-25	26-50	51-75	76-100	0	1-25	26-50	51-75	76-100
First Period * @ 7 - 8:00												
Second Period @ 8 - 9:00												
Third Period @ 9 - 10:00												
Fourth Period @ 10 - 11:00												
Fifth Period @ 11 - 12:00												
Sixth Period @ 1 - 2:00												
Seventh Period @ 2 - 3:00												

* If you have multiple courses per period please write in course names.

	9.5 Vocational					9.6 Handicapped Students # Enrolled				# Completed			
	0	1-25	26-50	51-75	76-100	Phy	Com	Lrn	Sev	Phy	Com	Lrn	Sev
First Period													
Second Period													
Third Period													
Fourth Period													
Fifth Period													
Sixth Period													
Seventh Period													

	9.7 Was There A Paid Aide?		9.8 Write In Aide's	9.9 Amount of Time In Minutes Aide Assisted in Independent Living Skills, Pre-vocational, and/or Vocational Skill Instruction.				
	Yes	No	Name	0	1-10	11-20	21-40	41+
First Period								
Second Period								
Third Period								
Fourth Period								
Fifth Period								
Sixth Period								
Seventh Period								

Appendix E

VOCATIONAL EDUCATION TEACHERS
INFORMATION INVENTORY

Please keep in mind that the critical information needed in this questionnaire concerns those independent living, pre-vocational, and vocational skills classes which you taught in the spring of 1978, which had handicapped students in them.

1. Your name: _____

2. District, spring 1978: _____

3. School, spring 1978: _____

4. Please estimate what additional demands were made on your time outside of class(es) each month, by virtue of your having had a handicapped student in your vocational education course(s). This may include such activities as meeting with the special education teacher, consulting the psychologist, counseling the student, attending inservice training sessions which are not budgeted in addition to your salary.

   No Extra Time____ 1 - 15 Minutes____ 16 - 30 Minutes____

   31 - 45 Minutes___ 46 - 60 Minutes____ 1 - 2 Hours_____

   3 - 4 Hours_____ More Than 4 Hours___

5. If you found that you spent more time with students with a particular handicapping condition, more than the others, please note below.

   _____

   _____

   _____

6. What additional supplies, materials, equipment, were needed to accommodate handicapped students in your class, that were not needed for regular students?

EQUIPMENT	SUPPLIES
_____	_____
_____	_____
_____	_____
_____	_____

7. Did you attend any inservice training sessions for teaching handicapped students during the summer of '77 to the present?

Yes_____ No_____

7a. If yes, were you paid in addition to your salary?

Yes_____ No_____

7b. Did you receive college credit for the inservice?

Yes_____ No_____

8. Reflecting on your schedule for last semester, spring, 1978, please fill out the following information for each class period:

Column 8 . 1: thru 8 . 4 Write in the title of the course you taught last semester (spring '78), (8.2) the days the course met, (8.3) the number of minutes per day the course met, and (8.4) the number of regular students that were in the class.

8 . 5: thru 8 . 14: Indicate the number of handicapped students enrolled at the beginning of the semester by their handicapping condition; (8.6) the number of handicapped students completing the course by handicapping condition; (8.7) the amount of extra time you spent per class for handicapped students; (8.8- 8.10) the percentage of time spent on independent living skills, pre-vocational, and vocational skills and (8.11 - 8.14) information related to an aide.

	8-1	8-2	8-3	8-4	8-5				
	Title of Course (Write In)	# Days Per Week Course Met	# Minutes Per Day Course Met	# Regular Students	# Handicapped Students Enrolled				
					Physically (Phy)	Communicatively (Com)	Learning (Lrn)	Severely (Sev)	Unknown (Unk)
First Period *									
Second Period									
Third Period									
Fourth Period									
Fifth Period									
Sixth Period									
Seventh Period									

* If you have multiple courses per period please write in course names.

8-6

8-7

	Number Handicapped Students Completed					Amount Of Time In Minutes Per Period That You Spent With Handicapped Students Beyond Time Required Of Regular Students					
	Phy	Com	Lrn	Sev	Unk	0	1-5	6-10	11-15	16-20	20 +
First Period											
Second Period											
Third Period											
Fourth Period											
Fifth Period											
Sixth Period											
Seventh Period											

	8-8					8-9					8-10				
	Check (✓) % of Time Spent On Independent Living Skills					Check (✓) % of Time Spent On Pre-Vocational Skills					Check (✓) % of Time Spent On Vocational Skills				
	0	1-25	26-50	51-75	76-100	0	1-25	26-50	51-75	76-100	0	1-25	26-50	51-75	76-100
First Period															
Second Period															
Third Period															
Fourth Period															
Fifth Period															
Sixth Period															
Seventh Period															

	8-11		8-12	8-13						8-14						
	Was There A Paid Aide		Aide's Name	Amount of Time Per Period (in minutes) aide spent with handicapped students beyond time required for regular students.						Amount of time aide spends outside of class each month required by virtue of students being handicapped						
										Minutes				Hours		
	Yes	No	(Write In)	0	1-5	6-10	11-15	16-20	21 +	0	1-15	16-30	31-60	1-2	3-4	5+
First Period																
Second Period																
Third Period																
Fourth Period																
Fifth Period																
Sixth Period																
Seventh Period																

Appendix F

SPECIAL SERVICES INVENTORY

NAME: _____

DISTRICT (Spring semester, 1978): _____

1. In the spring semester of 1978 what was your position in this district:

   _____

2. To which schools were you assigned?

   _____ _____ _____

   _____ _____ _____

3. How many students (total) were in your case load during the spring semester, 1978? _____ students

4. How many of these students were handicapped?

   Phy_____ Com_____ Lrn_____ Sev_____

5. How many hours per week did you work during the spring semester, 1978?

   1 - 5_____ 6 - 10_____ 11 - 20_____

   21 - 40_____ More than 40_____

6. What percentage of your time did you spend providing services to handicapped students related to their vocational education programs?

   0%_____ 1 - 10%_____ 11 - 25%_____

   26 - 50%_____ 51 - 75%_____ 76 -100%_____

7. What services did you provide handicapped students regarding their vocational education?

   Career Development _____

   Career Exploration _____

   Counseling _____

   Assessment _____

   Evaluation _____

   Other (please specify) _____

   _____

OVER

8. If you tutored or worked in a classroom, please list the courses in which you worked during 1977-78, in this district, and the average number of hours you worked in the course.

COURSE;	# HOURS
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

APPENDIX G

FORMS FOR COLLECTING COST DATA

DISTRICT:_____ INSTRUCTORS SALARIES AND FRINGE BENEFITE

SCHOOL:_____ (TEACHERS AND AIDES)

COURSE & TEACHER NAME	SALARY	+ FRINGE BENEFITS	TOTAL SALARY AND FRINGE	PERCENT OF TIME IN VEH PROGRAM	= PRORATED SALARY
1. Auto Mechanics					

Form 2

DISTRICT: _____

SCHOOL: _____

INSTRUCTIONAL SUPPLIES AND MATERIALS

PROGRAM	VOC. ED.	SP. ED.	CONSUMABLE SUPPLIES	TEXT BOOKS & REFERENCES	OTHER SUPPLIES	SPECIAL SUPPLIES	TOTAL

DISTRICT: _____ EQUIPMENT

SCHOOL: _____

COURSE	VOC. ED	SP. ED.	NEW EQUIPMENT	EQUIPMENT REPAIR	EQUIPMENT REPLACEMENT	SPECIAL EQUIPMENT	TOTAL

Form 4

DISTRICT: _____ ADMINISTRATIVE AND PERSONNEL SALARIES

SCHOOL: _____ AND FRINGE BENEFITS

TITLE	#	SALARY	+ FRINGE BENEFITS	TOTAL SALARY AND FRINGE	X PERCENT OF TIME SPENT IN VEH	= PRORATED SALARY
Sp. Ed. Admin Voc. Ed. Admin Secretaries Assistants Clerks						

Form 5

DISTRICT: _____ INSTRUCTIONAL SUPPORT PERSONNEL

SCHOOL: _____ SALARIES AND FRINGE

NAME & POSITION	SALARY	FRINGE	TOTAL SALARY FRINGE	PERCENT OF TIME IN VEH	PRORATED SALARY
Substitutes					
Tutors					
Counselors					
Interpretors					
Itinerant Teachers					

Appendix H

Dear Former Student:

When you were in high school, you may have taken some vocational education courses (such as typing, auto body, or work experience). We are trying to make these courses better, and we ask for your help. On the lower part of this card, we have asked you some questions about jobs you have had and other things you are doing now. Please answer these questions, and then tear off this part of the card. To mail your answers lick the strip on the bottom of this page, fold in half, and seal along the glue strip. Your name is not on the card and your answers will be used, along with everyone else's answers, to help improve our program.

Thank you for taking the time to help us.

(Tear off here) *(Tear off here)*

1. Male ☐ Female ☐
   (Please check one)

2. Please check the boxes that tell what you are doing now:
   a. I have a full-time job (working 35 or more hours a week) ..... ☐
   b. I have a part-time job (working less than 35 hours a week) ..... ☐
   c. I do not have a job, but I am looking for work ..... ☐
   d. I do not have a job, and I am *not* looking for work ..... ☐
   e. I am going to school ..... ☐
   f. I am married or getting married soon ..... ☐
   g. I am in the military (Army, Navy, Marines, etc.) ..... ☐

3. Who do you live with?
   Parents or relatives ☐ Friend(s) ☐
   Husband or wife ☐ Yourself ☐

4. How do you spend most of your time?
   In school ☐ At work ☐
   At home ☐ In recreational activities ☐
   Visiting ☐

5. Do you figure the change you should get back when you are buying something in a store? ..... Yes ☐ No ☐

6. Do you use public transportation? ..... Yes ☐ No ☐

7. Do you have your own money to spend? ..... Yes ☐ No ☐

8. Have you filled out a job application at a place of business? ..... Yes ☐ No ☐

9. Have you been interviewed at a place of business? ..... Yes ☐ No ☐

10. Did you have any training in high school on how to get along with the other workers? ..... Yes ☐ No ☐

11. Did you take one or more vocational courses (such as typing, welding, or work experience) when you were in high school? ..... Yes ☐ No ☐

Please turn the page *over*.

Glue Strip: Lick here, fold in half, and seal.

If you are working, or have worked, please answer the rest of the questions.

12. **What is (or was) your job title (the name of your job)?**

_____

(Write in the name of your job)

13. **How well do you like your job?** ..... **Very well** ☐ **O.K.** ☐ **Not at all** ☐

14. **Did any of your vocational courses in high school train you for your present job (or most recent job)?** ..... **Yes** ☐ **No** ☐

15. **Did you get any more job training after you left high school?** ..... **Yes** ☐ **No** ☐

16. **If you had more training, did any of your vocational courses in high school help you to get ready for the job training?** ..... **Yes** ☐ **No** ☐

Jan. 19. 1979

Dear:
Mr. Don Tarr
Assistant Director
Special Education
Grossmoont Union High
School District P.O. Box
11043 La Mesa California 92041

Mr. Tarr

The reason of this litter
is for if you can help me.
I'm out of shoal and waking
full time and still want
to have spare traning but
I dont know where to start
or where to go. The tipe of
traning I would like to know more
about is Aout Mechanics.
Mr. Tarr where I received
the cared that you wanted to
fill out it give me the decied
that you could help me
and I would Opreciated if you
did.

Thank you for your time